

Name:

Solutions

1. Given a line containing the points $(0, -5)$ and $(3, 7)$. Find an equation of the line in point-slope form. Convert your equation to slope-intercept form.

$$m = \frac{7 - (-5)}{3 - 0} = \frac{12}{3} = 4$$

$$y - 7 = 4(x - 3)$$

$$y - 7 = 4x - 12$$

$$y = 4x - 5$$

2. Given a line containing the points $(-3, 3)$ and $(9, 7)$. Find the equation of the line in slope-intercept form.

$$m = \frac{7 - 3}{9 - (-3)} = \frac{4}{12} = \frac{1}{3}$$

$$y = \frac{1}{3}x + b$$

$$7 = \frac{1}{3}(9) + b$$

$$7 = 3 + b$$

$$4 = b$$

$$y = \frac{1}{3}x + 4$$

3. Given a line containing the points $(-4, -11)$ and $(2, 4)$. Find an equation of the line in point-slope form. Convert your equation to general or standard form.

$$m = \frac{4 - (-11)}{2 - (-4)} = \frac{15}{6} = \frac{5}{2}$$

$$y - 4 = \frac{5}{2}(x - 2)$$

$$y - 4 = \frac{5}{2}x - 5$$

$$y = \frac{5}{2}x - 1$$

$$2y = 5x - 2$$

$$-5x + 2y = -2$$

4. Given a line containing the points $(4, 7)$ and $(-1, 7)$. Find the equation of the line in point-slope form.

$$m = \frac{7 - 7}{-1 - 4} = \frac{0}{-5} = 0$$

$$y - 7 = 0(x - (-1))$$

$$y - 7 = 0(x + 1)$$

$$y - 7 = 0$$

$$y = 7$$

5. Given a line containing the points $(-5, 8)$ and $(12, 8)$. Find the equation of the line.

$$m = \frac{8 - 8}{12 - (-5)} = \frac{0}{17} = 0$$

$$y - 8 = 0(x - 12)$$

$$y - 8 = 0$$

$$y = 8$$

6. Given a line containing the points $(-3, 11)$ and $(-3, 2)$. Find the equation of the line.

$$m = \frac{2 - 11}{-3 - (-3)} = \frac{-9}{0} = \text{undefined}$$

you cannot use any of the three primary forms.

$$x = -3$$

7. Given a line containing the points $(3,9)$ and $(-6,3)$. Find an equation of the line in all three forms, starting with point-slope form.

$$m = \frac{3-9}{-6-3} = \frac{-6}{-9} = \frac{2}{3}$$

$$y-3 = \frac{2}{3}(x-(-6))$$

$$y-3 = \frac{2}{3}(x+6)$$

$$y-3 = \frac{2}{3}x + 4$$

$$y = \frac{2}{3}x + 7$$

$$3y = 2x + 21$$

$$2x - 3y = -21$$

8. Convert the equation $3x - 2y = 8$ to slope-intercept form.

$$3x - 2y = 8$$

$$-2y = -3x + 8$$

$$\frac{-2y}{-2} = \frac{-3x}{-2} + \frac{8}{-2}$$

$$y = \frac{3}{2}x - 4$$

9. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = 4x - 7$ & $y = \frac{1}{4}x - 1$

$y = 4x - 7$ has slope $m_1 = 4$

$y = \frac{1}{4}x - 1$ has slope $m_2 = \frac{1}{4}$

4 & $\frac{1}{4}$ are not the same and not opposite reciprocals. The lines are neither parallel nor perpendicular.

10. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = \frac{3}{2}x + 1$ & $y = \frac{3}{2}x - 4$

The slopes are the same; both are $\frac{3}{2}$.

The lines are parallel.

11. The two given equations represent lines. Are the lines parallel or Perpendicular or

neither? Explain briefly why. $y = \frac{5}{2}x - 3$ & $y = \frac{-2}{5}x - 3$

$\frac{5}{2}$ & $-\frac{2}{5}$ are opposite reciprocals.

The lines are perpendicular.

12. The two given equations represent lines. Are the lines parallel or Perpendicular or neither? Explain briefly why. $4x + y = -3$ & $x - 4y = -8 + 2$

$$4x + y = -3$$

$$y = -4x - 3$$

$$x - 4y = -6$$

$$-4y = -x - 6$$

$$y = \frac{1}{4}x + \frac{3}{2}$$

The slopes are -4 & $\frac{1}{4}$.

The lines are perpendicular.

13. The two given equations represent lines. Are the lines parallel or Perpendicular or neither? Explain briefly why. $x - 2y = 4$ & $-3x + 6y = -18$

$$\begin{aligned}x - 2y &= 4 \\ -2y &= -x + 4 \\ y &= \frac{1}{2}x - 2\end{aligned}$$

$$\begin{aligned}-3x + 6y &= -18 \\ 6y &= 3x - 18 \\ y &= \frac{1}{2}x - 3\end{aligned}$$

The slopes are the same.
The lines are parallel.

14. Line A has equation $y = 3x + 1$. Line B contains the point $(-1, -8)$ and is parallel to line A. Determine an equation for line B.

Line B has slope $m = 3$.

$$y - (-8) = 3(x - (-1))$$

$$y + 8 = 3(x + 1)$$

15. Line A has equation $y = \frac{2}{5}x - 6$. Line B contains the point $(4, -9)$ and is perpendicular to line A. Determine an equation for line B.

Line B has slope $-\frac{5}{2}$.

$$y - (-9) = -\frac{5}{2}(x - 4)$$

$$y + 9 = -\frac{5}{2}(x - 4)$$

16. Write an equation of the line with slope $m = -\frac{1}{2}$ and y-intercept $b = 10$

$$y = -\frac{1}{2}x + 10$$

17. Write an equation of the line with ^{Point}~~slope~~ $(4, -6)$ and y-intercept $b = 10$

$$\begin{aligned}y &= mx + 10 \\ -6 &= m(4) + 10 \\ -16 &= 4m \\ -4 &= m\end{aligned}$$

$$\begin{aligned}y - (-6) &= -4(x - 4) \\ y + 6 &= -4(x - 4)\end{aligned}$$

18. Write an equation of the line with ^{Point}~~slope~~ $(-10, 6)$ and ^{slope}~~y-intercept~~ $m = \frac{2}{5}$

$$y - 6 = \frac{2}{5}(x + 10)$$